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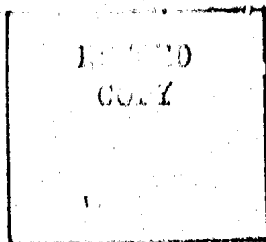
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~~UNCLASSIFIED~~ INFORMATION ON SOVIET  
BLOC INTERNATIONAL GEOPHYSICAL COOPERATION  
-1960

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INFORMATION ON SOVIET BLOC INTERNATIONAL GEOPHYSICAL COOPERATION - 1960

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INTERNATIONAL GEOPHYSICAL COOPERATION PROGRAM --

SOVIET-BLOC ACTIVITIES

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## I. GENERAL

### Limitations of the Universal Law of Attraction

In a full page article a reporter of Nedelya asks Moscow astronomer, professor Boris Aleksandrovich Vorontsov-Vol'yaminov to explain his contention that Newton's universal law of attraction does not apply in some cases.

Professor Vorontsov-Vol'yaminov replies that the "tails" or "webs" of certain double, or multiple galaxies, and the lack of such phenomena indicate that the universal law of attraction alone does not explain "mutual-action galaxies," and that with extreme changes in the unit of measure, from the mega-world to the micro-world, extreme results also are produced, which also explains why this exception was not discovered before. ("Beyond the Dome of the Megaworld," by V. R. Keler, Nedelya, No. 24, August 1960, page 15)

### A Climate-Changing "Saturn Ring" for the Earth

In a brief article in Ekonomicheskaya Gazeta A. Presnyakov discusses an idea of Valentin Borisovich Cherenkov for creating a ring of small particles around the Earth which would capture some of the Sun's energy now lost to us, to produce heat and light.

According to Cherenkov's plan a belt of particles averaging 0.3 micron in diameter, 100 kilometers wide and 1,000 to 1,500 kilometers above the Earth between 70 and 90 degrees north latitude would be sufficient to change the climate of the northern hemisphere.

A plan forwarded by M. Grodskiy consists of creating a belt of potassium particles with a lower altitude of 1,200, and an upper altitude of 10,000 kilometers, and a total weight of 1,750,000 tons. This material would be carried aloft by rockets and dispersed by a special centrifugal apparatus. The effect of the reflecting belt would be to reflect to the Earth a greater part of the one two-billionths of the Sun's energy which it now receives, greatly improving the thermal system of the northern hemisphere, improving navigation of the North Sea routes and northern rivers, and would have no appreciable effect upon the tropical latitudes. ("Reflecting Ring of the Earth," by A. Presnyakov, Ekonomicheskaya Gazeta, 12 August 1960, page 4)

## II. ROCKETS AND ARTIFICIAL EARTH SATELLITES

### "Strelka" and "Belka" in Satellite Orbit

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The following is a full translation of an article appearing in the 20 August 1960 issue of Pravda on the launching of the second Soviet animal-carrying satellite.

In conformance with the plans for study of cosmic space, the second space ship was placed into an Earth-satellite orbit from the Soviet Union on 19 August 1960. The main task of the launching is the further development of systems which will ensure the vital activity of man, and will ensure his flight and return to Earth.

The cabin, which is equipped with all the essentials for the future flight of man, contains pre-experimental animals, including two dogs, named "Strelka" and "Belka."

During the flight of the space ship-satellite many medicobiological experiments are to be conducted and the program of scientific investigation of cosmic space is to be carried out.

The second Soviet space ship-satellite is in an orbit closely approximating a circle, with an altitude of approximately 320 kilometers.

The initial period of revolution of the space ship is 90.6 minutes, and the angle of inclination of its orbit from the equatorial plane is 65 degrees. The weight of the space ship-satellite without the last stage of the carrier-rocket is 4,600 kilograms.

The space ship-satellite carries a "Signal" radio transmitter operating at 19.995 megacycles, radio telemetering equipment for transmitting to the Earth data on the status of the pre-experimental animals and on all the systems installed on board the satellite.

A radio-television system has been installed on board the space ship-satellite for observation of the behavior of the animals.

Preliminary data indicate that the systems installed on board the space ship-satellite are functioning normally. ("TASS Report," unsigned, Pravda, 20 August 1960, page 1)

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### Conditions Aboard Second Space Ship-Satellite

The following is a full translation of an article appearing in the 20 August 1960 issue of Pravda on conditions aboard the second animal-carrying Soviet satellite.

According to the initial results of processing of the telemetric data transmitted from the space ship-satellite the equipment installed on board is functioning normally. The transmissions of the "Signal" transmitter installed aboard the satellite are being positively received by receivers located at numerous points.

The pressure, temperature, composition and humidity of the air in the cabin are maintained within the limits of established norms. During the entire period of orbiting the air temperature in the cabin has been maintained at approximately 20 degrees Centigrade and 760 mm pressure.

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The data of telemetric measurements of physiological parameters characterizing the status of the animals indicate that they satisfactorily survived the period of launching and entering into orbit of the space ship-satellite. The pulse of the dog "Strelka" prior to launching was 90, and frequency of respiration was 60. During the period of entry into orbit its pulse rose to 160 and respiration rose to 125. After one and one-half hours its pulse was 65 and respiration 24.

The pulse rate of the dog "Belka" before launching was 75, and respiration rate was 24. During the period of entry into orbit its pulse rose to 150 and its respiration rose to 240. After one and one-half hours its pulse rate was 72 and its respiration rate was 12.

The data indicate that during flight in orbit under conditions of weightlessness the physiological functions of animals are normalized. Images of the animals, also indicating normalization of physiological functions, are received through the television system. The taking of food by the animals also is registered.

On the basis of measurement of the elements of its orbit the space ship-satellite has the following values: period of revolution 90.7 minutes, altitude of perigee 306 kilometers, altitude of apogee 340 kilometers, and inclination of orbit from the equatorial plane 64 degrees 57 minutes.

Observations of the space ship-satellite are continuing.

("Motion of the Second Soviet Space Ship-Satellite," unsigned, Pravda, 20 August 1960, page 1)

#### Amateurs Receive Space Ship-Satellite Signals

The following is a full translation of an article appearing in the 20 August 1960 issue of Pravda, on reception of signals from the second Soviet animal-carrying satellite.

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Leningrad, 19 August. (By telephone.) As soon as the news of the launching into orbit of the second space ship was announced over the radio tens of Leningrad radio amateurs turned to their receiving sets. First to receive the signals of the space ship of 9 points intensity at a frequency of 19.995 megacycles were the DOSAAF radio station attendants on duty at that time: I. V. Filippov and M. M. Novikov. The signals were received immediately afterward by I. N. Zhuchenko, engineer of the Electrotechnical Institute of Communications imeni M. A. Vorch-Buevich, radio amateurs V. V. Bychkovskiy, M. D. Osipov, and others. ("Space Ship Signals Received," unsigned, Pravda, 20 August 1960, page 6)

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#### Hungarians Stick By Claim To Have Seen Soviet Rocket Hit Moon

Laszlo Detre blames incorrect press reports for the fact that doubts arose concerning the Hungarian observation of the lunar impact of Lunik II. He notes that publication number 45 of the Astronomical Observations Institute (Csillagvizsgalo Intezet) of the Hungarian

Academy of Sciences constituted an official report on the Hungarian observations. His present article reviews this report for the Hungarian public.

Miklos Lovas and Bela Balazs began observations at 2055 hours World Time using an 18 centimeter Cooke refractor. Shortly before 2100 hours they were joined by Dr. Julia Balazs and an MTE (Hungarian press service) representative. The first observation was made just after 2102:30 hours at which time Lovas noticed an expanding black point. His colleagues, using the same instrument by turns, verified that the spot was expanding. The black point became gray as it expanded, retaining its circular shape for one minute, a bright point appeared to the south of the center of the spot and as the spot expanded it (the spot) elongated a little toward the north. Within 4 minutes the spot had lost its definite contour and the bright point had disappeared. At 2108 hours Karoly Gefferth began to observe the phenomenon with a 30 centimeter Zeiss refractor. According to him the faint spot was visible until 2115. TASS subsequently reported that the radio signals of the rocket ended at 2102:24 hours.

The spot appeared north of the Apennines in the Mare Imbrium. The confusion among the Budapest observers caused by differences between the photographic and the visual appearance of this area, made the location of the spot, on locally available standard photographs, uncertain within limits of 20-30 kilometers. The coordinates decided on were plus .024 and plus .434 (using the atlas of the International Astronomical Union), but this was based on the belief of one of the observers that the bright point had been caused by a small crater visible on the Mt. Wilson photograph of the area, an hypothesis later rejected.

Marton Ill, of the Baja (Hungary) observatory, located the spot much more precisely. Ill had observed the spot at 2103 hours using the Baja 26-centimeter Newton reflector which was coupled to a 10-centimeter refractor. Mihaly Borbas observed the spot through this refractor. Ill's description of the phenomenon tallies with that of the Budapest observers; he was able to see the spot until about 2115 hours. He gave the coordinates as plus .03 and plus .45, about 25 kilometers northwest of that decided on in Budapest.

Detre's article then discusses other alleged observations of the impact, especially a photograph taken by E. Tengstrom, using the Markowitz camera of the Uppsala geodetic institute. A spot on this photograph exactly coincides with the coordinates given by Marton Ill. Detre also claims that the Hungarian observations fit in well with Soviet results (as published by TASS, 20 September 1959). This indicates that the Hungarian observations were of the impact of the instrument package, and not the rocket. The Tengstrom photographs show another spot inside the Manilius crater which may have been caused by the rocket impact.

Detre hypothesizes that the instrument package broke a thin wall of a lunar cavity and that escaping gases caused the dust cloud. ("Optical Observation of the Impact of the Second Soviet Lunar Rocket" by Laszlo Detre, Budapest, Magyar Tudomany, July 1960, pages 391-395)

L. I. Sedov Addresses Astronautics Congress

The following is a complete translation of an article appearing in the 16 August 1960 issue of Pravda on the Stockholm congress of the International Federation of Astronauts.

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Stockholm, 15 August (TASS). The congress of the International Federation of Astronauts (IFA) opened today at Stockholm. Attending the congress were 800 delegates and guests from 33 countries.

The opening address of the congress was given by President of the Swedish Royal Academy of Sciences Professor B. Lindblad. Academician L. I. Sedov, president of the IFA, appealed to participants at the congress in a long speech.

We live in an epoch of great scientific and technical progress, said L. I. Sedov. The achievements of science and technology have a great influence upon the life and interrelationships of peoples. Only three years have passed since the beginning of the space age. They have been marked by heroic achievements in science and technology. Many artificial satellites of the earth have been launched, remarkable flights have been made to the vicinity of the Moon, new planets, made by man, have been placed in orbit around the Sun... Experimental research work is in full swing, and is being conducted in ever-increasing volume. New designs of rockets for flights to the Moon, Venus, Mars and other planets may be considered with the utmost confidence to be realized within the years of the immediate future.

The task of the return of satellites to the Earth has been placed on the agenda of the day, continued Academician L. I. Sedov. Experiments already are being conducted, and we hope for a rapid and successful solution. In this connection, the flight of man into space and his subsequent return to the Earth may be resolved in the near future. As in other fields of science and technology, noted L. I. Sedov, complete international cooperation also is of essential importance in astronautics. This evident statement is supported by the scientific organizations and governments of various states.

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L. I. Sedov emphasized that the main task of the IFA is the strengthening of international contacts, and the stimulation of the development of astronautics in the various states. ("Congress of the International Federation of Astronautics," unsigned, Pravda, 16 August 1960, page 4)

Explanation of Photographs of Opposite Side of Moon

An article by B. Koltovoy, special correspondent for Izvestiya, in the 18 August 1960 issue, summarizes the description by Professor A. Mikhaylov of the Soviet satellite photographs of the opposite side of the Moon before the International Congress of Astronauts.

Negatives of the photographs of the opposite side of the Moon, taken in October 1959 by a Soviet satellite, were processed independently at the astronomical observatory of the Khar'kov State University,



the Pulkovskaya observatory near Leningrad, and the Astronomical Institute Ioni Shternberg at Moscow, and the results were compared. To eliminate errors originating in transmission of the photographs, the method of interpretation used involved obtaining many photometric sections of each negative at various levels of its density. This produced 251 catalogued details, approximately 100 of which are in the region visible from the Earth, 191 less noticeable details which appeared on only two of the negatives, and 57 features which either appeared on only one negative, or were very poorly distinguishable. Professor Mikhaylov cited many hypotheses explaining the difference between the two sides of the Moon as not due to external causes. ("Main Theme -- The Moon," by B. Koltovoy, Izvestiya, 18 August 1960, page 4)

#### Problems and Possibilities of Space Flight

A group of articles under a single title appears in a recent issue of Znaniye-Sila, in which six authors give their views on various aspects of the flight of man into space.

A. Dmitriyev, on pages 30 and 31, discusses the problem of the enormous distances involved in interstellar flight and human physiology, and of the type of engine to be used.

V. Smigla evolves his argument from pages 31 to page 33 to the effect that a photon-powered rocket is a fantastic impossibility.

A. Dmitriyev, on pages 34 and 35, answers the arguments of V. Smigla against a photon rocket, through utilization of a "magnetic mirror" for photon propulsion.

On pages 35 and 36 M. Karev discusses the problems of overcoming contact with matter and radiation in space, which is answered by A. Dmitriyev on page 37 with an explanation of how the effects of radiation in space may be overcome.

A. Chudakov discusses the optimal speed of space flight and protection against meteorites on pages 37 and 38.

On pages 38 through 40 R. Perel'man and K. Stanyukovich give an over-all optimistic argument for the possibilities of a photon rocket and for protection against the hazards of space flight. ("We May Wager the Date Has Been Set," authors as indicated, Znaniye-Sila, No. 7, 1960, pages 30-40)

### III. UPPER ATMOSPHERE

#### Radiolocation of Meteorites

The authors of a 2-1/2-page article in *Izobretatel' i Ratsionalizator* describe the working principle of a radio locating device for recording meteorites which was first used during the International Geophysical Year and which continues its useful work. The device was developed by V. Tsesevich, B. L. Kashcheyev, B. S. Dudnik, I. A. Lysenko, Ye. I. Fialko, F. I. Peregudov, K. V. Kostylev and Yu. A. Loshchilov, who also have solved many theoretical problems of investigation of the formation of an ionized track. As a meteorite enters the atmosphere it ionizes the ionosphere along its path. This ionized track reflects radio waves longer than 10 to 12 meters transmitted toward the sky by the device, and the interval and strength of the reflected impulse on a cathode tube, indicating the altitude of the meteorite are photographed automatically. Measurement of the speed of meteorites requires additional components for detecting changes in the signal. ("Falling Star Hunters," by V. Burov and L. Tsesarkin, *Izobretatel' i Ratsionalizator*, No. 4, 1960, pages 14-21)

#### Study on the Distribution of Meteors According to Velocities

The problem of determining the distribution of meteor bodies according to velocities is considered in some detail in an article by Ye. I. Fialko, Tomsk Polytechnic Institute imeni S. M. Kirova, in a recent issue of *Astronomicheskii Zhurnal*. Fialko makes these conclusions: The distribution of meteor bodies according to velocities is essentially different from the distribution of meteor bodies according to velocities which are measured by the radar method. This is due to the lower sensitivity of the radar method to slow meteors. The average velocity of meteor bodies is lower than the average velocity of meteors according to the results of radio measurements. It is possible to assume that the relative number of meteor bodies with geocentric velocities equal or greater than 72 km/sec is extremely small, however in order to confirm this, a careful study of faint meteors in a wide range of velocities is needed. ("On the Distribution of Meteor Bodies According to Velocities," by Ye. I. Fialko, Moscow, *Astronomicheskii Zhurnal*, Vol. 37, No. 2, 1960, pages 354-356)

#### Curving Path of Meteors Confirmed for First Time by Photographs

Photographic confirmation of the curvature of the path of some meteors during their motion through the Earth's atmosphere was obtained recently for the first time. The occasion is reported by M. D. Popova, Sector of Astronomy, Bulgarian Academy of Sciences, in the latest issue

of Astronomicheskii Zhurnal. From the microgram it was deduced that this particular case has to do with a change in the direction of motion of a meteor body and is not caused by its disintegration, as the curvature is not accompanied by rapid changes in its brightness. On the basis of this first photograph Popova says that the curving is connected with the shape of the meteor body, that is, that in this specific case the effect appears to be similar to the effect of a boomerang. The hypothesis is made that the nonhomogeneity of the meteor body and the considerable difference in the evaporation temperature in different parts caused such a change in its shape at a given altitude that it led to the observed curving path. ("On the Curvature of the Path of Some Meteors During Their Motion in the Earth's Atmosphere," by M. D. Popova, Sector of Astronomy, Bulgarian Academy of Sciences, Moscow. Astronomicheskii Zhurnal, Vol. 37, No. 2, 1960, pages 352-353)

#### IV. METEOROLOGY

##### Telephoto to Aid Meteorologists

In a brief article on the advantages of the use of telephoto in connection with weather prognosis appearing in Sovetskaya Aviatsiya, Engineer-Major V. Sokolov describes the operating principle of the telephoto apparatus, and states that the transmission of synoptic meteorological material via telephoto places downstream meteorologists in a position enabling them to evaluate materials which otherwise would be unavailable to them, such as maps of the barimetric topography, and in addition to facilitating local prediction, also aid in long-range forecasting, thus also furthering elimination of the two sources of error and inaccuracy in forecasting: objective and subjective, the former as a result of increasing knowledge of atmospheric processes over large areas of the earth's surface, and the latter through placing the skill and experience of wiser forecasters at the disposal of the local meteorologists. ("Telephoto -- New Aid to the Meteorologist," by Engineer-Major V. Sokolov, Sovetskaya Aviatsiya, 16 August 1960, p 2)

##### Total Heat of Solar Radiation At Sea Recorded From Antarctic to Baltic

Utilizing the solarigraph method of V. V. Shuleykin, during the voyage of the "Ob'" from Mirnyy antarctic station to the Baltic Sea the total insolation during winter in the Southern Hemisphere was found to reach a maximum in the tropical zone of the Northern Hemisphere, where it reached 850 cal/cm<sup>2</sup>, and the minimum was found in the subantarctic, ranging from 11 to 122 cal/cm<sup>2</sup> per day. ("Recording Total Heat of Solar Radiation At Sea From 64° South, to 60° North Latitude," by V. V. Shuleykin, Doklady Akademii Nauk SSSR, Vol. 133, No. 2, 1960, pages 352-353)

## V. SEISMOLOGY

### Local Earthquake in Turkmen SSR

The following is a full translation of an article appearing in the 18 August 1960 issue of Izvestiya, on a local earthquake recorded by the Turkmen Academy of Sciences.

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Ashkhabad, 17 August. (By telephone, from our correspondent.)

On 16 August at 1458 hours 19 seconds, local time, a local earthquake occurred in the region of Ashkhabad. The quake was felt by several inhabitants of the city.

The results of the processing of instrument readings by the seismology sector of the Academy of Sciences Turkmen SSR indicate that the epicenter of the earthquake was located toward the northeast, approximately 20 to 25 kilometers from Ashkhabad. The intensity of the earthquake at Ashkhabad was approximately four or five points. There was a total of two shocks, at an interval of three minutes. The first shock was directed toward the northeast, and downward.

This earthquake, like others in Turkmen, has a tectonic nature, or one connected with mountain-formation. ("Local Earthquake in Ashkhabad," unsigned, Izvestiya, 18 August 1960, page 4)

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### Soviet Seismic Chart Used As Construction Criterion

Asked by the editorial board of Izvestiya to comment on the Agadir and Chilean earthquakes, B. Petrushevskiy, doctor of geology and mineralogy, describes three types of earthquakes: collapse, volcanic and tectonic, and their destructive consequences. Dr. Petrushevskiy mentions the tsunami warning system developed during recent years. Dr. Petrushevskiy states that the first attempts at combatting the effects of earthquakes began in the USSR more than 20 years ago, with the work of the Institute of Physics of the Earth of the Academy of Sciences USSR, which at present also is carried on by the combined work of geophysicists and geologists of many academies of sciences of the soviet republics. This complex work has resulted in the creation of a seismic map, the first of its kind, which indicates regions of possible earthquakes and which serves as an official document in construction work. China, Bulgaria and Rumania also are preparing similar seismic maps. ("Breathing of the Planet," by B. Petrushevskiy, Izvestiya, 16 August 1960, page 6)

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VI. OCEANOGRAPHY

"Hydrostat" Explores Fish Population of Depths

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A. Presnyakov, special correspondent for Ekonomicheskaya Gazeta describes his tour aboard the expeditionary ship "Tunets" and a dive in the diving bell "Hydrostat."

The "Hydrostat" was designed by naval engineer Petr Ivanovich Serdyuk, who had designed a similar diving bell in 1939, the building of which was interrupted by World War II. The diving bell is of closed construction, has two cylindrical walls of stepped, different diameter, and a self-contained air system including a carbon dioxide removal system, enabling the bell to remain submerged for six hours. Electric power for the flood-, and spot lights, and for telephone communication is supplied through separate lines in a cable. The spotlight has two filaments: 50,000 candle-power with an illuminating distance of 3 to 5 meters, and 100,000 candle-power for illuminating to a distance of 25 meters. The floodlights are used for photography and taking motion pictures. The spotlight may be rotated 22 degrees upward and 64 degrees downward. With diver V. Kitayev on board the hydrostat has reached a depth of 620 meters. The bell has been tested at a pressure of 75 atmospheres, which is equivalent to a depth of 750 meters.

The "Tunets" sailed from the Polar Scientific Research and Planning Institute of Sea Fishing and Oceanography (PINRO) at Murmansk for testing the "Hydrostat" in the Atlantic Ocean. The "Tunets," which left the docks in 1957, is equipped with the latest radio navigational equipment, powerful, high speed engines, and well-built cabins. The "Hydrostat" is an underwater laboratory, with a photometer for measuring horizontal illumination including an indicator inside the diving bell, thermometer, gas analyzer, depth gauge, and photographic and motion picture cameras. In case of emergency a special device cuts the supporting cable and the "Hydrostat" rises to the surface in five minutes. This operation has been tested at a depth of 245 meters. Plans for a bathyscape have been completed in the Soviet Union. The "Tunets" recently radioed information from the Sea of Norway on observations of deep sea fauna, and their reactions to light and sound. The "Tunets" now is heading for the Barents Sea. The "Hydrostat" is considered to be a very important tool and a great aid to development of the Soviet fishing industry. Four photographs are included of the deep-sea spotlight, the "Hydrostat," and the designer.

("Man Steps Into the Sea," by A. Presnyakov, 7 August 1960, page 4, and "The 'Tunets' Radios Us," by O. Kiselev, Ekonomicheskaya Gazeta, 14 August 1960, page 1)

Zonal Distribution of North Pacific Deep Bottom Fauna

Utilizing all available quantitative data on the northern portion of the Pacific Ocean, and especially the results of the 29th voyage of the Soviet Ship "Vityaz'" 1958-1959, the authors describe,

In a three-page article, the map of the quantitative distribution of deep-bottom fauna in the abysses deeper than 2,000 meters. The map shows a marked zonal character, which reflects the two basic sources of food for bottom fauna. ("Quantitative Distribution of Bottom Fauna in the Northern Portion of the Pacific Ocean At Depths Greater Than 2,000 M," by L. A. Zenkevich and Z. A. Filatova, Doklady Akademii Nauk SSSR, Vol. 133, No. 2, 1960, pages 451-453)



## VII. ARCTIC AND ANTARCTIC

### "Flying Laboratory" Leaves for Arctic

The following is a full translation of an article appearing in Sovetskaya Aviatsiya, 18 August 1960, on the flight into the Arctic of an aircraft specially equipped for meteorological observation.

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Leningrad, 17 August, (TASS). Today a specially equipped "Il-14" aircraft of the polar air force took off from the Leningrad airport on a course into the Arctic. On board this "flying laboratory" were members of the aerometeorological expedition of the Arctic and Antarctic Institute, headed by scientific associate A. I. Voskresenskiy.

The weather prospectors will complete regular voyages into the northern high latitudes from the arctic seaport of Tiksi. With the aid of various scientific instruments they will perform meteorological observations and measurements at various altitudes. It is planned to conduct simultaneous complex aerometeorological investigations in the Arctic.

The operational data will be transmitted directly by radio from the aircraft to the arctic synoptic bureaus for compilation of weather forecasts which are necessary to ships travelling the North Sea route during the final period of arctic navigation.

The work of the "flying laboratory" is planned to last one and one-half months. ("Flying Laboratory," unsigned, Sovetskaya Aviatsiya, 18 August 1960, page 4).

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